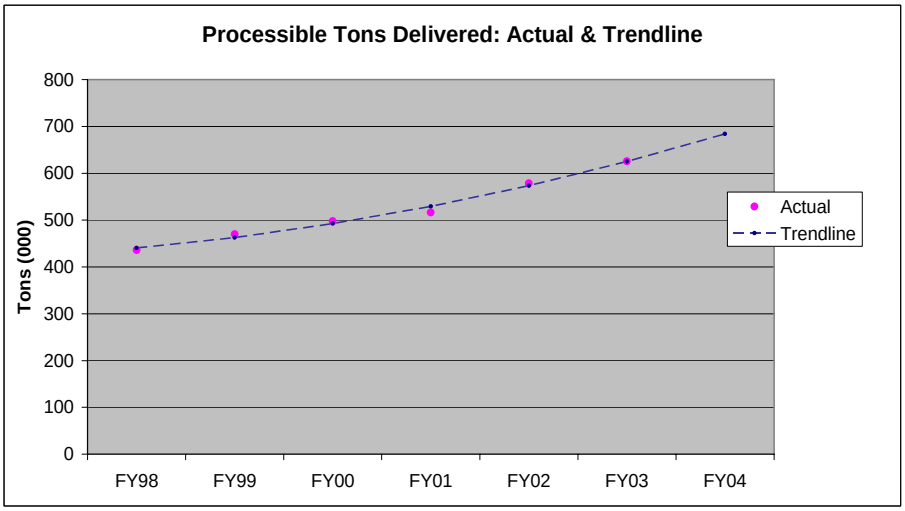
Tipping Fee Strategic Analysis, January 2004

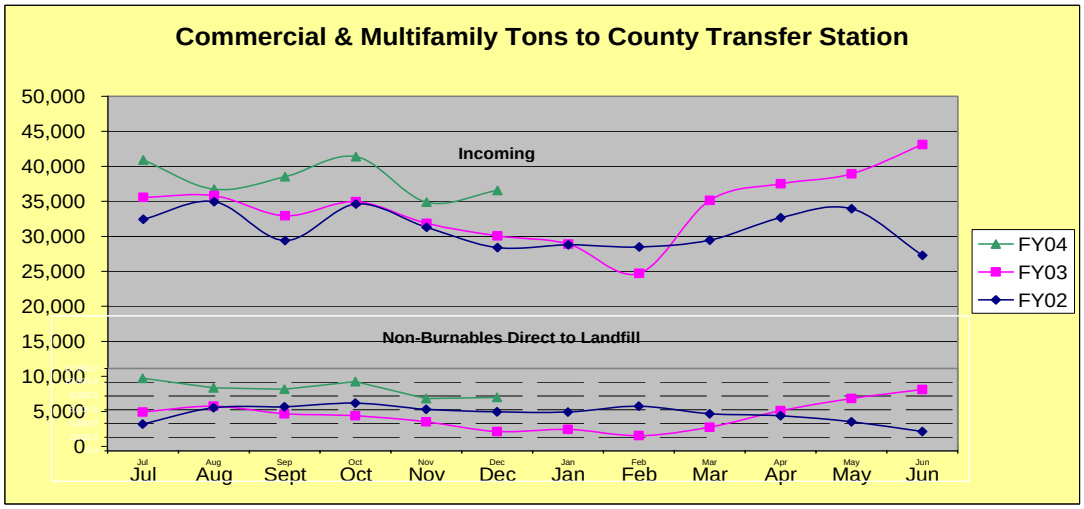
Waste deliveries to the County vary over time, making it difficult to discern trends other than long-term. Exhibit 1 shows the history of waste processed (e.g. burned) in the RRF, as well as the best-fit trend line. For the period FY96 through FY03, the County Tipping Fee was held constant at $44.00/ton. An upward-curving trend line fits that data better than a straight line, suggesting extra-normal influences which are examined below. Extending that best fit trend line, would project 684,000 tons for FY04, which if realized, would cause the County to utilize more expensive and undesirable provisions of its integrated solid waste management system (e.g. RRF "by-pass"). The RRF permit limit is 657,000 ton per calendar year. Based on the analysis below, DSWS *estimates* that a Tipping Fee increase to $56.00/ton should be implemented April 1, 2004, in order to minimize RRF by-pass tonnage during FY04.

Exhibit 1



The County Tipping Fee was increased to $48.00/ton on July 1, 2003. Exhibits 2 show monthly deliveries for the two years preceding the fee increase, and for the first six months of FY04, immediately following the fee increase. Only deliveries from types of

Exhibit 2



waste expected to be influenced by the tipping fee—commercial and multi-family—are shown. (Deliveries from single-family homes, convenience centers, the public unloading facility, and MRF residue are not shown, (although these have increased just slightly also.) In the face of monthly variations, and recognizing that there may be some time-lag needed for industry to respond, it is too early to determine precisely the effect of the July 1, 2003 Tipping Fee increase. ***However, it is quite clear that monthly deliveries, so far in FY04, are higher, not lower, than last year.***

Exhibit 2 also shows outgoing non-burnable tons. These are materials shipped directly to the landfill rather than to the RRF. Although these are *outgoing* tonnage figures, they suggest a substantial increase in *construction and demolition debris (C&D) wastes* delivered to the County's Transfer Station. This type of waste is important and is discussed later in this report.

Before leaving Exhibit 2, it may be worth noting that commercial and multi-family tonnage in FY03 tonnage was higher than in FY02 by more that 10%, and that this increase occurred mostly during the *last four months* of FY03 (e.g. *after the tipping fee recommendation for FY04*). Had these increases been known, together with C&D-related issues discussed below, DSWS would have been influenced to recommend a greater fee increase.

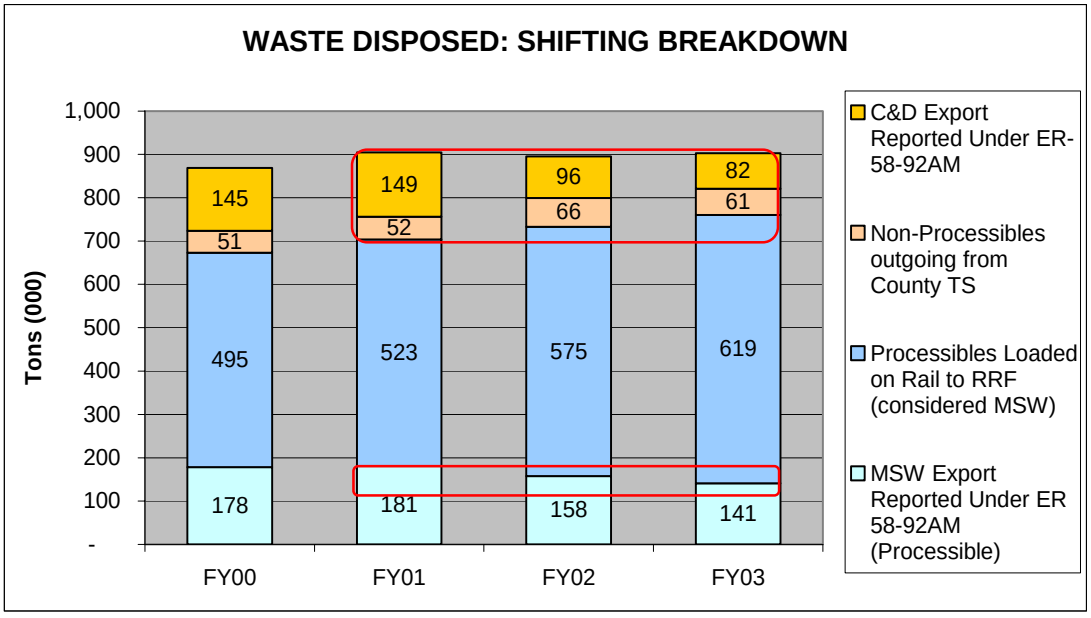
To better estimate what added incentive might be needed to moderate deliveries, DSWS examined: trends in waste disposal patterns, types of waste being disposed, relative use of the County's and alternate disposal facilities in the region, and factors thought to influence the relative use of available disposal facilities by private haulers.

Trends in Waste Disposal

By virtue of Executive Regulation 52-98AM, Montgomery County is able to know how many tons of waste it exports (and where that waste goes). Under that regulation, all licensed haulers are required to report, in 6-month intervals, how many tons were collected from Montgomery County customers, and precisely where these tons were disposed. All reports are tied to certified truck scale records and are field-audited by DSWS staff. (Export tonnages for the first half of FY04 will be reported to DSWS February 1, 2004.) On these reports, haulers must report *municipal solid waste* (MSW) separately from *construction and demolition debris* (C&D), and they must report both types of waste handled.

Tracking these different types of disposal waste makes possible Exhibit 3, below, which suggests that two distinct types of shift are influencing deliveries of processible waste to the County—one having to do with MSW, and the other having to do with C&D.

Exhibit 3



The lower and upper portions of the graph (see red outlines) evidence that recent shifts in the disposition of both types of waste—MSW and C&D—have contributed to increasing tonnage deliveries of processible (burnable) waste to the County's RRF.

Evident in the lower part of Exhibit 3 is a shift from exported MSW in the direction of MSW delivered to the County. Note that essentially all MSW is considered processible in the RRF.

Exhibit 4

Evident in the upper part of Exhibit 3 is a shift from exported C&D toward C&D delivered to the County Transfer Station. That this shift involves County RRF capacity may be easier to understand when one recognizes that C&D is comprised not just of concrete, dirt and rock, but *mostly of burnable materials* as pictured in Exhibit 4, above.

From FY01 to FY03, MSW export decreased by 40,000 tons. During the same period, C&D export plus "Non-Processibles outgoing from the County" decreased by 58,000 tons—a combined decrease of 98,000. During the same period, processible waste shipped to the RRF increased by a like amount, 96,000 tons. For these reasons the

County's economic flow control strategy needs to recognize both MSW and C&D disposal options available to private waste collectors. Importantly, regional disposal options for these two types of waste (MSW and C&D) differ significantly as to price and availability to waste collectors.

Regional MSW Facilities and Competitive Tip Fees

From the fact that 141,190 tons of MSW were exported during FY03, it is clear that, even prior to its Tipping Fee increase, the County's Transfer Station was not the cheapest option for haulers, at least for some haulers, and for a substantial amount of MSW.

Exhibit 5

Exhibit 5 shows MSW export during FY03, by major hauler, and by receiving disposal facility.

FY03 MSW Export by Major Hauler and Destination

Total Non-residential & Multi-Family MSW (no C&D)	Out-of-County Transfer Station	(Tons)
BFI Waste Systems of North America, Inc. (Frederick)	Annapolis Junction	6,855
	BRESCO	29
	Georgetown Paper	155
		7,039
BFI Waste Systems of North America, Inc. (Ritchie)	Brown Station	2,301
	Consolidated IPC	3,436
		5,737
BFI SubTotal	*9.0%*	12,776
Waste Management of MC (WMX)	Annapolis Junction	81,679
	BRESCO	7,056
	Georgetown Paper	160
	N E Transfer	6,805
	Fort Totten	18,519
WMX Subtotal	*80.9%*	114,218
Company Export vs Deliveries to County TS		52.4%
WMX and BFI Subtotal		126,994
Other Haulers	*10.1%*	14,196
Total Export	*100.0%*	141,190

Together, just two companies—BFI Waste Systems of North America, Inc. (BFI), and Waste Management of Montgomery County, Inc. (WMX) were responsible for 89.1% of MSW export during FY03 (mostly Waste Management), and a single Transfer Station (Annapolis Junction) received 70% of that flow.

Industry contacts advise that in the absence of contractual obligations, two key factors influence the choice of disposal facility: (1) relative costs of transportation plus tipping fee costs, and (2) opportunity cost. With respect to the former, equilibrium flow patterns yield to straight-forward economic analysis, but the time needed to establish a new equilibrium cannot be predicted. Likewise, the influence of opportunity costs can only be guessed. Industry sources advise, especially with respect to front-end loaders, that fleets have become "tight". With its normal collection fleet in pursuit of lower tipping fees are more distant locations, companies must, for example, press available spares into duty to fulfill existing collection contracts, retard maintenance, and/or forego additional collection contracts.

All of the facilities that received Montgomery County MSW publicly post tipping fees well in excess of the County Tipping Fee, and yet received the waste indicated, which waste was collected from within Montgomery County. The tipping fees advertised

by private disposal facilities, often called "Gate Rate", are posted for the purpose of "spot-market" commerce, but most private facilities are willing to contract a portion of their capacity, on a put-or-pay basis, for lower but generally undisclosed "contract rates". The case of Waste Management and the Annapolis Junction Transfer Station warrants special attention.

Annapolis Junction

Waste Management of Montgomery County (WMX) split its FY03 waste between Annapolis Junction (81,679 tons, shown in Exhibit 5) and the County Transfer Station (103,723 tons, based in County scale records). The Annapolis Junction Transfer Station, located 25 road-miles from the County Transfer Station, is owned and operated by the same parent company that owns Waste Management of Montgomery County.

The DSWS has credible information as to the actual rates charged at Annapolis Junction relative to BFI and Waste Management tonnages. For most of FY03, these fees were in the high $30's and low $40's —well less than the County Tipping Fee. In so much as an increase in the County Tipping Fee represents a change in market forces, the result is a change in equilibrium waste flows. DSWS modeling suggests that if waste flows controlled by Waste Management of MD, Inc. were freely and fully influenced only by transportation costs and tipping fees, and if all other influences remained unchanged, then a $4/ton increase in the County Tipping Fee would be more than sufficient to shift the equilibrium for all Waste Management tons (over 100,000 tons per year) from the County's Transfer Station to the Annapolis Junction Transfer Station.

How freely and quickly the local collection company, Waste Management of MC, Inc., can *respond to a change in market equilibrium* (e.g. by shifting delivery of the waste it controls more toward the Transfer Station owned by its parent company) is not known. Industry contacts advise that there is a strong interest in internalizing costs among sister companies to the benefit of the parent, which would tend toward maximum use of the facility for waste hauled by subsidiary companies. However, there may be competing constraints, existing private contracts with fixed terms, for example, or external countervailing forces. From what is known, it is clear is that there is competition for the Annapolis Junction capacity.

Two sponsoring local jurisdictions, Anne Arundel and Howard Counties, have contractual disposal rights to the facility. Relevant provisions, and historical tonnages, were learned from the Northeast Maryland Waste Disposal Authority. Waste Management (WMX) reportedly receives $33.00/ton from Anne Arundel and Howard Counties for residential waste delivered to Annapolis Junction up to an average of 900 TPD, which limit now tends to be exceeded 2 to 3 days per week. A contract dispute exists relative to requirements of the company to accept additional waste from these jurisdictions and the associated fee, which excess per ton waste fee we understand to be in the low "$40's".

During FY03 about 34% (235,984 tons) of the Annapolis Junction throughput was residential waste from Anne Arundel and Howard Counties, 13% (88,534 tons) came from private haulers of Montgomery County waste, and 53% (365,450 tons) was delivered from other private commercial sources in the region. Presumably, much of this 365,450 tons was collected by the owner's subsidiary hauling companies, and some may be contractually dedicated to other private haulers. Both factors could contribute to intransigence of the facility's waste flows relative to pressures from a Montgomery County tipping fee.

It is also reported that Annapolis Junction is proceeding to work with MDE to increase to the facility's permit limit, which limit in terms of a daily limit (3,000 TPD). The Company will need to seek all Anne Arundel County approvals in addition to the MDE approval for such an increase.

Montgomery County tonnage to Annapolis Junction occurring subsequent to the July 1, 2003 Tipping Fee increase will not be known until February, 2004. Total annual deliveries to Annapolis Junction (all jurisdictions, public and private flows) increased by 17% (up 100,232 tons) from FY02 to FY03. At the same time, the MSW contribution to AJ from Montgomery County declined by 19,562 tons and total MSW export from Montgomery declined by 16,650 tons. A possible implication of this is that Annapolis Junction, although still a major participant in the regional waste flows, and by far the largest recipient of Montgomery County MSW export, may be declining in importance relative to County strategies to moderate deliveries, *especially with respect to the short term.*

Other MSW Facilities and Their Tipping Fees

Other than BFI and Waste Management, collectors in Montgomery County handle annual tonnages believed to too small to secure lower-than Gate Rate tipping fee put-or-pay type contracts. For these collectors, some guesswork is eliminated, since the tipping fees influencing the hauler's choice of MSW disposal option are the Gate Rates publicly advertised by the disposal facilities.

Exhibit 6, below, lists the MSW Gate Rates for 22 MSW disposal facilities in the region as of October, 2003. The exhibit also indicates facility location, owner, policies relating to waste acceptance, and C&D pricing if that type of material is also accepted. ***Eleven (11) indicated that they accept out-of-jurisdiction waste.*** Gate Rates at all but one of these 11 exceeded Montgomery County's $48.00/ton fee (ranging from $55.00/ton to $67.50/ton). Seven indicated that they do offer lower fees for contract tonnage. However, four of these are located in the District of Columbia, a jurisdiction known to be seeking additional Transfer Station capacity. Of the three Virginia facilities that accept outside MSW, two are quite distant (Leesburg and Manassas), leaving the Arlington/Alexandria Counties' Waste-to-Energy Facility, operated by Covanta, for which contract tonnage terms could not be learned. As late as FY01, Montgomery County MSW has been exported to one Pennsylvania facility, in Greencastle. Since that

state imposed a $4.00/ton surcharge on all waste (to fund State programs) no Montgomery County MSW export has flowed to Pennsylvania.

Of the three Maryland facilities that accept out-of-jurisdiction MSW, one is Annapolis Junction, which has a gate rate of $60.00/ton, and otherwise has been discussed above. Both the Baltimore City Landfill and the Baltimore BRESCO Waste-to-Energy Facility post gate rates of $67.50/ton. Of these, privately owned BRESCO is operated by the same parent company as that of Waste Management of Montgomery County. The operator owns all facility capacity not contractually dedicated to sponsoring Baltimore City and County waste, and has consistently availed itself of significant BRESCO capacity for Montgomery County waste (7,056 tons in FY03).

Exhibit 6

MSW FACILITY TIPPING FEE SURVEY

Facility Name	MSW "GATE RATE" PUBLISHED (Actual Contract Rates Can Be Much Lower, But Not Published)	Public/Private-Owner	Accepts out-of-jurisdiction Waste	MSW Large-Tonnage Contract Rate (as available)	C & D Rate
Maryland					
Annapolis Junction (Trans. Stn.)	$60.00	Waste Management	YES	CONFIDENTIAL	CONFIDENTIAL
Anne Arundel County, Millersville LF	$65.00	Public	NO	$65.00	$65.00
Baltimore City Landfill	$67.50 - *cash only*	Public	YES	$67.50	67.50 - *cash only*
Baltimore County, Eastern Landfill	$60.00	Public	NO	$60.00	$60.00
BRESCO, Waste-to-Energy	$67.50	Waste Management Inc.	YES	CONFIDENTIAL	Not Accepted
Frederick County, Landfill	$50.00	Public	NO	$40.00	$50.00
Howard County, Landfill	$60.00	Public	NO	$60.00	$60.00
Montgomery County, Trans. Station	$48.00	Public	NO	$48.00	$48.00
Prince Georges County, Brown Station	$49.00 - *cash only*	Public	NO	$49.00	Not Accepted
Virginia					
Alexandria / Arlington Counties, WTE	$56.84	Covanta, Inc.	YES, but $60/ton	Depends on quantity	Not Accepted
Fairfax County, I-66 TS (to Lorton WTE)	$55.00	Public	NO	$39.95	Not Accepted
Fairfax County, Lorton WTE	$55.00	Public	NO	$39.95	Not Accepted
Loudoun County,Landfill	$55.00	Public	NO	$55.00	$55.00
Manassas Transfer Station	$56.00	Waste Management, Inc.	YES	Depends on quantity	$56.00
Old Dominion, Leesburg, Trans. Stn.	$56.00	Waste Management, Inc.	YES	Depends on quantity	$52.00
Prince William County	$45 for towns, $50 for cities	Public	NO	Not Available	Only accept residential in very limited amounts
Pennsylvania					
Mountain View Reclamation	$58.00	Waste Management, Inc.	YES	Depends on quantity	$53.25
District of Columbia (all Transfer Stations)					
Benning Road, TS to Lorton WTE	$64.39	Public (Operated by D.C. Government) Waste hauled by Urban Services	NO	$64.39	Not Accepted
Consolidated IPC* , 1220 W St., NE	47.50*	BFI, Inc.	YES*	47.50*	47.50*
Eastern Transit, 1315 First St., SE	$55.00	Eastern Trans-Waste of Maryland, Inc.	YES	$45.00 - $50.00	$55.00
Fort Totton, TS to Lorton WTE	$64.39	Public (Operated by D.C. Government) Waste hauled by Urban Services	NO	$64.39	$64.39
LGI, 1140 3rd St., NE	$56.50**	Waste Management, Inc.	YES	$49.50 **	$49.50 **
Northeast Transfer Stn., 2160 Queens Chapel Road, NE	$56.50**	Waste Management, Inc.	YES	$49.50 **	Not Accepted

*This facility is scheduled to stop operation by December 31, 2003.

**These rates are as of April 2001; Owner no longer quotes rates over the phone.

Updated October 2003 Jeanne Risher, DSWS

Assuming (1) that the extent to which Annapolis Junction accepts Montgomery County waste is completely uninfluenced by Montgomery County Tipping Fees increases, and (2) that Montgomery County haulers (other than WMX and perhaps BFI) cannot secure lower-than spot market Gate Rates, then the forgoing review of MSW disposal options suggests that a County Tipping Fee *exceeding $60.00/ton* would be necessary to affect significant diversion of waste to other disposal options in the region. However, the intransigence of Annapolis Junction is not known, and it is also important to factor the roll of C&D waste in our Tipping Fee strategy.

C&D Facilities and Competitive Tip Fees

Referring back to Exhibit 3, there has been an apparent shift taking place in the disposition of C&D waste, at least since FY01, toward greater use of the Montgomery County Transfer Station. The reader is referred to the upper red outline in Exhibit 3. From the trends suggested in Exhibit 3, it can be seen that at least *with respect to recent increases* in RRF capacity utilization, the role of C&D may be more important than that of MSW. In particular, the increases in C&D tonnage burned since FY01 would appear to be approximately 58,000 tons.

Referring back to Exhibit 2, this shift appears to be continuing in FY04 (see tonnages plotted for "outgoing non-burnables to landfill"). By sampling loads, DSWS determined that non-burnable C&D generally represents only a fraction (about 17%) of incoming C&D in a typical open top roll-off box. Thus, the recent increase in "outgoing non-burnables" shown in Exhibit 2 suggests that the even larger increases in incoming processible waste may be largely attributable to C&D. Also, as will be noted, price and availability of regional C&D disposal options differ significantly from those for facilities designed to accept MSW.

Burnable components of C&D include, for example, land clearing debris and wood waste. We are using "non-processible" interchangeably with "non-burnable" although some items (e.g. sheet rock and shingles are burnable, it is not desirable to do so.) With respect to total incoming C&D, outgoing non-processible materials can be viewed as the complement of the "processible" fraction. Relative to the RRF, such materials are "processible" (e.g. burnable). The role of processible C&D in waste flows to the RRF is important, and not just the apparent shift suggested by Exhibit 3, but it would be desirable to know the total roll played by processible C&D in flows to the RRF.

Generally, C&D is delivered in "roll-off boxes". Unfortunately, the exact composition of *inbound* roll-off boxes (e.g. burnable C&D/non-processible C&D/MSW) often cannot be known upon entry (nor, therefore, recorded upon entry) into the County Transfer Station. Therefore, if one wishes to know the role of "processible C&D" in waste flowing to the RRF, this has to be inferred and can only then be estimated. Two independent approaches yielded similar estimates— 114,457 versus 123,248 tons—for the FY03 period. (See Appendix A for details.)

What is important here is not the precision of the foregoing estimate, but that its general magnitude confirms what is suggested by Exhibit 3—that C&D plays a *significant roll* in RRF capacity utilization. As such, regional C&D disposal options need to be recognized in the County's Tipping Fee strategy.

The importance of this is amplified by the fact that ***price and availability of regional C&D disposal options differ significantly from those for facilities designed to accept MSW***. Price differences stem largely from differences in the regulatory requirements governing these two types of disposal facilities. Regulatory requirements governing C&D facilities are generally less stringent than those governing MSW disposal

facilities. MSW cannot be received into facilities permitted to accept only C&D, however, C&D can be disposed at facilities permitted to accept MSW. Although still less costly to satisfy than MSW landfill regulations, C&D landfill regulations were recently made more stringent, causing many facilities to close. Locally, the Gaithersburg Recycling Center closed this last July. Regional disposal options relevant to Montgomery County C&D waste is, perhaps, best examined by consulting the actual disposition of C&D during the most recent Fiscal Year period. During FY03, C&D generated within Montgomery County was disposed at 37 facilities other than the County Transfer Station.

Exhibit 7 lists the top eight most popular destinations (which, together, took nearly 90% of County C&D exported), together with their location, tipping fees and distance in road miles from the County's Transfer Station.

Exhibit 7
FY03 C&D Export From Montgomery County

Name of Receiving Facility	Address	Tons	% of Total	Posted Tipping Fee	Miles
Ritchie Land Reclamation	Ritchie Marlboro Rd., Upper Marlboro	39,464	48.0%	$ 45.00 /ton	34.30
Lorton Landfill	10001 Furnace Rd., Lorton	15,197	18.5%	$ 270.00 $/30 CY	38.10
Annapolis Junction (WMX)	Brock Bridge Rd., Jessup	5,924	7.2%	$ 60.00 /ton	34.85
Gaithersburg Recycle Ctr.	8701 Snouffer School Rd., Gaithersburg	3,862	4.7%	Closed 7/1/03	NA
Ameriwaste	7140 KitKat Rd., Elkridge	2,972	3.6%	$ 48.00 /ton	35.26
Merrifield Transfer	2801 Dorr Ave., Fairfax	2,433	3.0%	$ 56.00 /ton	22.59
Hilltop Sand & Gravel	7950 Telegraph Rd., Alexandria	2,045	2.5%	$ 230.00 $/30 CY	34.75
The Recycling Center	14852 Old Gundpowder Rd., Laurel	1,548	1.9%	$ 125.00 $/30 CY	27.73

C&D facilities generally operate on a "spot market" basis (e.g. large put-or-pay contracts securing lower-than-gate-rate deals for C&D haulers are thought to be relatively rare). For a Tipping Fee strategy aimed at *immediate effectiveness*, this has two important implications. First, rates are known. Second, unconstrained by contractual ties to dedicated facilities, C&D haulers may respond more quickly to tipping fee pressures.

Some C&D tipping fees are expressed on the basis of volume, in cubic yards (CY), of the container used for waste transport. In the Exhibit, facilities with fees in terms of $/30 CY box, also have rates relative to other size boxes and fees vary, but almost all boxes received by the County TS are 30 CY, and this is presumed to be the most relevant fee. In December, 2003, Lorton raised its fee 31% to that listed.

Having received by far the most Montgomery County C&D, the Ritchie Land Reclamation, in Upper Marlboro, MD, would appear to be the most important facility with respect to our tipping fee strategy. Ritchie charges $45.00/ton to receive C&D and is located 30.4 miles from the Montgomery County Transfer Station.

Breakeven Analysis

The "breakeven" tipping fee is the County Tipping Fee which results in equal overall costs to a theoretical hauler. Exhibit 8, calculates theoretical breakeven tipping fees under various assumptions, relative to the Ritchie option for haulers.

A range for each assumption was employed. It should be noted that the circumstance where vehicle maintenance, depreciation and other management overhead is as low as shown in the "low" case above would be excepted only in winter months, or when opportunity costs are otherwise largely absent.

Breakeven Tipping Fees Relative to Ritchie C&D Facility

Percentage of County Export C&D in FY03		48.0%		
Transportation Costs	Low	Medium	High	
Driver Salary, Direct Pay ($/hr)	$ 13.00	$ 15.00	$ 18.00	$/hr
Fringe and overhead rate	20%	25%	30%	
Fringe and overhead as $/hr	$ 2.60	$ 3.75	$ 5.40	$/hr
Subtotal, ManHour cost ($/hr)	$ 15.60	$ 18.75	$ 23.40	$/hr
Diesel Fuel	$ 1.43	$ 1.57	$ 1.71	$/gal
Fuel Mileage	9.0	8.5	8.0	MPG
Average Speed	49.00	49.00	49.00	
Subtotal, Fuel	$ 7.79	$ 9.05	$ 10.47	$/hr
Vehicle Maintenance, Depreciation, & Management Allowance as $/hr	$ 0.30	$ 0.40	$ 0.50	$/mile
Total Travel Cost Rate as $/hour, Man and Vehicle	$ 14.70	$ 19.60	$ 24.50	$/hr
Distance From Gaithersburg, County TS (Mapquest™)	$ 38.09	$ 47.40	$ 58.37	$/hr
Distance From Waste Generator to County TS	34.3	34.3	34.3	miles
Time, Round-Trip to/from Alt. Facillity	8.0	4.0	0.0	miles
Travel Cost per Trip To/From Alt. Facility	0.63	0.72	0.82	hours
Time, Round-Trip To/From County TS	$ 23.85	$ 34.20	$ 47.67	$/trip
Travel Cost per Trip To/From County TS	0.19	0.10	-	hours
Tons/Trip	$ 7.25	$ 4.51	$ -	$/trip
Tons per Load*	-1 Std Dev	Average	+1 Std Dev	*
Total Cost of Travel To/From Alternate Facility ($/ton)	6.30	3.58	0.85	ton/30 CY
Total Cost of Travel To/From County Transfer Station ($/ton)	$ 3.79	$ 9.56	$ 56.04	$/ton
Tipping Fee in $/ton	$ (1.15)	$ (1.26)	$ -	$/ton
Break-Even Montgomery County Tipping Fee	$ 45.00	$ 45.00	$ 45.00	$/ton
	$ 47.63	**$ 53.30**	**$ 101.04**	$/ton

* Statistics as sampled at the County Transfer Station, 208 roll-off boxes sampled, October 23 & 24, 2003.

A similar analysis (see Appendix B) was applied to the next five largest receivers of Montgomery County C&D, accounting for another 35% of County C&D received in FY03. Depending on facility, the results yielded "low" values ranging from $39.44/ton to $62.64/ton, "medium" values ranging from $56.43/ton to $85.34/ton, and "high" values ranging from $84.34/ton to $364.55/ton.

No analysis was done for Gaithersburg Recycling Center or for The Recycling Center, "TRC", located in Laural, MD. The former closed last July, and C&D haulers advised that TRC only accepts limited, very clean and uniform materials.

It should be noted that a new C&D recycling facility is under construction in Montgomery County just north of Clarksburg. The Refuse Disposal Permit Application for this facility states that the owner expects to accept, during the first year of operation, 78,000 tons of C&D (including 1,000 tons of land clearing debris) and that the accepted material will be sorted for recyclable components, the remainder hauled to a landfill. The owner's projection of incoming tonnage grows to 128,000 in five years. The fees to be charged at that facility are unknown. It is also not known how selective the operator will be with respect to accepted materials.

Summary Finding

Waste disposal tonnages received at the County Transfer Station increased unexpectedly during the last quarter of FY03, and continued to *increase*, not decrease, during the first six months following the July 1, 2003 Tipping Fee increase.

Both MSW and C&D type wastes have been found to be responsible for the increase in deliveries to the County in recent years. Price and availability of regional C&D disposal options differ significantly from those for facilities designed to accept MSW.

Waste Management, which owns the Annapolis Junction MSW Transfer Station, delivered 104,000 tons to the County during FY03. If Annapolis Junction capacity used by Montgomery County waste proves *intransigent* to County Tipping Fee pressure, then posted gate rates at area disposal facilities will control the disposition of MSW, and a County Tipping Fee *exceeding $60.00/ton* will be necessary to affect significant diversion of MSW.

However, DSWS estimates that well over 100,000 tons of capacity used at the County's RRF derive from C&D delivered to the County. Based on estimated transportation costs and regional posted tipping fees, a County Tipping Fee of $56.00/ton will be sufficient to affect a significant shift in C&D disposal away from the County Transfer Station.

Given the increased MSW waste flows experienced since March 2003, a like increased pressure ($56.00 per ton) on Waste Management to haul more County MSW to its Annapolis Junction Transfer Station would not be inappropriate at this time.

Recommendations

It is recommended that the County increase its Base Solid Waste Charge (Tipping Fee) to $56.00/ton effective April 1, 2004.

In so much as regional C&D facilities constitute a distinctly different disposal market, the County should also:

(a) Endeavor to institute a means of routinely distinguishing incoming tonnages of C&D from MSW, and if this is possible,
(b) Consider instituting a separate fee targeting C&D beginning in FY05.

Appendix A
Estimates of C&D Burned at RRF During FY03

Generally, C&D is delivered in "roll-off boxes". The exact composition of *inbound* roll-off boxes (e.g. burnable C&D / non-processible C&D / MSW) often cannot be known upon entry (nor, therefore, recorded upon entry) into the County Transfer Station. Therefore, if one wishes to know the role of "processible C&D" in waste flowing to the RRF, this has to be inferred and can only then be estimated. To make such an estimate, DSWS took two independent approaches as described below and illustrated with Exhibits A-1 and A-2.

In one approach, DSWS estimated total *MSW* disposed from all nonresidential waste generators in the County, and applied this result to its County-wide materials flow accounting for FY03. The amount of MSW generated for disposal was estimated, from the point of view of the waste generators, by applying the statistical results of field sampling at nonresidential properties. In Exhibit 7, item d was calculated by multiplying sample mean pounds of MSW disposed per square foot of property improvement, for each of sampled 39 business property types, by the aggregate square feet of each actual business property type in the County as of July 2003. Items a and b are from the DSWS County-wide materials accounting for FY03. Subtracting item d from the subtotal of MSW export plus nonresidential tons loaded on rail to the RRF during FY03 yields an *estimate that approximately* 114,000 tons of C&D were burned in the RRF during FY03.

Exhibit A-1

Estimate of C&D Burned at RRF, Inferred From Commercial Property Sampling and County-Wide Tonnage Accounting

		FY03 tons	
a	Non-Residential MSW Export	103,957	Hauler Reported per ER 52-98 (DSWS-Audited)
b	Non-Residential MSW Loaded on Rail	303,819	To RRF to be burned (processible and "processed" at RRF)
c	subtotal	407,776	a + b
d	Sampled Mean lb/Sq. Ft. x total Sq. Ft.	(293,319)	Aggregate Result, Non-Residential Waste Generation Sampling
e	Net of above	114,457	Estimated tons of C&D materials burned in RRF during FY03

A second, independent approach, provides a reasonableness of the above estimate. The second approach is based on observations from the point of view of the Transfer Station, as illustrated in Exhibit A-2. C&D materials are generally delivered to the Transfer Station in "open-top roll-off boxes". Therefore, in this approach, DSWS first queried all Transfer Station scale records involving roll-off type vehicles bringing waste for disposal, excluding tonnages received form beauty spots (County convenience centers) and MRF residue, (the latter being handled by roll-off boxes). Roll-off boxes are transported via "roll-off trucks", and a new scale transactions system enabled query of all transactions involving roll-off trucks. Since roll-off trucks can transport not just roll-off boxes but also MSW compactors, a deduction had to be made for MSW delivered in compactors on roll-off trucks. This was done by recording, for three full days (November 17, 18 and 19, 2003), each scale ticket involving an MSW compactor delivered on a roll-off truck, which sampling indicated that 89.67% of waste disposal tons carried on roll-off trucks were contained in roll-off boxes (e.g. 10.33% of such tons were in MSW

compactors *carried* on roll-off trucks). This yields that 168,833 tons of waste were received for disposal in roll-off boxes for disposal during FY03 (from other than County convenience centers and MRF residue). Of that incoming roll-off box tonnage, some would be non-processible materials ultimately directed to the landfill, some would be loose MSW directed to the RRF, and the remainder would be the object of interest—burnable C&D processed at the RRF.

Previous sampling conducted at the Transfer Station (October, 2002), had found that that 17.0%, by weight, of the material delivered in roll-off boxes was comprised of non-processible (e.g. non-burnable) material. This factor was judged reasonable for two reasons. First, because it was based on month-long sampling performed by TS staff, and, second, because applying that factor to the 168,883 tons figure nearly accounted for all of the 32,354 tons of outgoing non-processible materials that Covanta (the TS operator) loaded out from the Tipping Floor for landfilling during FY03 (e.g. the factor could not be greater than 19.2% without implying an outgoing tonnage exceeding the actual amount scaled out by the operator). The 17% figure is used in Exhibit A-2.

Although roll-off boxes are generally used for C&D, and not loose MSW, Transfer Station staff observe that some roll-off boxes contain significant amounts of loose MSW. (County law only precludes the use of open top roll-off boxes for *highly putrescible* materials.) For the last deduct, TS staff provided a guesstimate that 10% of tonnage delivered in roll-off boxes was loose MSW. (A 15% factor would yield a final result matching that of Exhibit A-1, but TS staff felt that 10% was a better estimate for the amount of loose MSW in roll-off boxes.) Applying 10% for this final factor, yields an estimate that *approximately* 123,000 tons of C&D materials, received in open top roll-off boxes, were burned at the RRF during FY03.

Exhibit A-2

Estimated C&D Burned at the RRF Inferred From Transfer Station Observations

	FY03 (tons)
Tons Received via "Roll-Off Trucks" (w/o Beauty Spots & MRF)	188,288
Weight Percent of Above in Open Top Roll-Off Boxes*	89.67%
Tons Received in Open Top Roll-Off Boxes	168,833
Weight Percent of Roll-Off Box Loads Non-Processible**	17.00%
Weight Percent of Roll-Off Box Loads MSW***	10%
Incoming C&D Estimated to be Burned in RRF	123,248

*Result of full-day observations, 658 transactions, Nov. 17-19, 2003.

**Based on full-month sampling at Transfer Station, October, 2002

**Estimate based on visual observations of roll-off box loads.

Appendix B

Breakeven Tipping Fees Relative to Other C&D Facilities

	Lorton Landfill			Annapolis Junction (WMX)			Ameriwaste			Merrifield Transfer			Hilltop Sand & Gravel			
Percentage of County Export C&D in FY03	18.5%			7.2%			3.6%			3.0%			2.5%			
Transportation Costs	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High	
Driver Salary, Direct Pay ($/hr)	$ 13.00	$ 15.00	$ 18.00	$ 13.00	$ 15.00	$ 18.00	$ 13.00	$ 15.00	$ 18.00	$ 13.00	$ 15.00	$ 18.00	$ 13.00	$ 15.00	$ 18.00	$/hr
Fringe and overhead rate	20%	25%	30%	20%	25%	30%	20%	25%	30%	20%	25%	30%	20%	25%	30%	
Fringe and overhead as $/hr	$ 2.60	$ 3.75	$ 5.40	$ 2.60	$ 3.75	$ 5.40	$ 2.60	$ 3.75	$ 5.40	$ 2.60	$ 3.75	$ 5.40	$ 2.60	$ 3.75	$ 5.40	$/hr
Subtotal, ManHour cost ($/hr)	$ 15.60	$ 18.75	$ 23.40	$ 15.60	$ 18.75	$ 23.40	$ 15.60	$ 18.75	$ 23.40	$ 15.60	$ 18.75	$ 23.40	$ 15.60	$ 18.75	$ 23.40	$/hr
Diesel Fuel	$ 1.43	$ 1.57	$ 1.71	$ 1.43	$ 1.57	$ 1.71	$ 1.43	$ 1.57	$ 1.71	$ 1.43	$ 1.57	$ 1.71	$ 1.43	$ 1.57	$ 1.71	$/gal
Vehicle Mileage	9.0	8.5	8.0	9.0	8.5	8.0	9.0	8.5	8.0	9.0	8.5	8.0	9.0	8.5	8.0	MPG
Average Speed	53.16	53.16	53.16	48.63	48.63	48.63	49.20	49.20	49.20	31.52	31.52	31.52	48.49	48.49	48.49	MPH
Subtotal, Fuel	$ 8.45	$ 9.82	$ 11.36	$ 7.73	$ 8.98	$ 10.39	$ 7.82	$ 9.09	$ 10.52	$ 5.01	$ 5.82	$ 6.74	$ 7.70	$ 8.96	$ 10.36	$/hr
Vehicle Maintenance, Depredciation, & Management	$ 0.30	$ 0.40	$ 0.50	$ 0.30	$ 0.40	$ 0.50	$ 0.30	$ 0.40	$ 0.50	$ 0.30	$ 0.40	$ 0.50	$ 0.30	$ 0.40	$ 0.50	$/mile
Allowance as $/hr	$ 15.95	$ 21.27	$ 26.58	$ 14.59	$ 19.45	$ 24.31	$ 14.76	$ 19.68	$ 24.60	$ 9.46	$ 12.61	$ 15.76	$ 14.55	$ 19.40	$ 24.24	$/hr
Total Travel Cost Rate as $/hour, Man and Vehicle	$ 40.00	$ 49.83	$ 61.34	$ 37.91	$ 47.18	$ 58.11	$ 38.18	$ 47.52	$ 58.52	$ 30.06	$ 37.18	$ 45.90	$ 37.85	$ 47.10	$ 58.01	$/hr
Distance From Gaithersburg, County TS (Mapquest™)	38.1	38.1	38.1	34.85	34.85	34.85	35.26	35.26	35.26	22.59	22.59	22.59	34.75	34.75	34.75	miles
Distance From Waste Generator to County TS	8.0	4.0	0.0	8.0	4.0	0.0	8.0	4.0	0.0	8.0	4.0	0.0	8.0	4.0	0.0	
Time, Round-Trip to/from Alt. Facillity	0.70	0.79	0.89	0.62	0.72	0.81	0.63	0.73	0.82	0.34	0.43	0.53	0.62	0.72	0.81	hours
Travel Cost per Trip To/From Alt. Facility	$ 28.00	$ 39.52	$ 54.35	$ 23.67	$ 33.85	$ 47.09	$ 24.20	$ 34.54	$ 47.98	$ 10.20	$ 16.07	$ 24.11	$ 23.55	$ 33.68	$ 46.88	$/trip
Time, Round-Trip To/From County TS	0.19	0.09	-	0.19	0.09	-	0.19	0.09	-	0.19	0.09	-	0.19	0.09	-	hours
Travel Cost per Trip To/From County TS	$ 7.44	$ 4.64	$ -	$ 7.05	$ 4.39	$ -	$ 7.10	$ 4.42	$ -	$ 5.59	$ 3.46	$ -	$ 7.04	$ 4.38	$ -	$/trip
Tons/Trip	-1 Std Dev	Average	+1 Std Dev	-1 Std Dev	Average	+1 Std Dev	-1 Std Dev	Average	+1 Std Dev	-1 Std Dev	Average	+1 Std Dev	-1 Std Dev	Average	+1 Std Dev	
Tons per Load*	6.30	3.58	0.85	6.30	3.58	0.85	6.30	3.58	0.85	6.30	3.58	0.85	6.30	3.58	0.85	ton/30 CY
Total Cost of Travel To/From Alternate Facility ($/ton)	$ 4.44	$ 11.05	$ 63.90	$ 3.76	$ 9.47	$ 55.36	$ 3.84	$ 9.66	$ 56.41	$ 1.62	$ 4.50	$ 28.34	$ 3.74	$ 9.42	$ 55.11	$/ton
Total Cost of Travel To/From County Transfer Station ($/ton)	$ (1.18)	$ (1.30)	$ -	$ (1.12)	$ (1.23)	$ -	$ (1.13)	$ (1.24)	$ -	$ (0.89)	$ (0.97)	$ -	$ (1.12)	$ (1.23)	$ -	$/ton
Tipping Fees at Alternate Facility	$ 270	$ 270	$ 270										$ 230.00	$ 230.00	$ 230.00	$/ 30CY
Density of C&D (lb / gross box cubic yard)*	416	238	60	No Need to Convert Units			No Need to Convert Units			No Need to Convert Units			416	238	60	lb/CY
Tipping Fee in $/ton (converted as needed)	$ 43.23	$ 75.59	$ 300.65	$ 60.00	$ 60.00	$ 60.00	$ 48.00	$ 48.00	$ 48.00	$ 56.00	$ 56.00	$ 56.00	$ 36.82	$ 64.39	$ 256.11	$/ton
Break-Even Montgomery County Tipping Fee	**$ 46.49**	**$ 85.34**	**$ 364.55**	**$ 62.64**	**$ 68.24**	**$ 115.36**	**$ 50.71**	**$ 56.43**	**$ 104.41**	**$ 56.73**	**$ 59.53**	**$ 84.34**	**$ 39.44**	**$ 72.58**	**$ 311.22**	

* Statistics as sampled at the County Transfer Station, 208 roll-off boxes sampled, October 23 & 24, 2003.